DEPARTMENT OF ENVIRONMENTAL SERVICES
CITY AND COUNTY OF HONOLULU
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DEPUTY DIRECTOR

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DEPUTY DIRECTOR

IN REPLY REFER TO:

EMC 12-172

July 13, 2012

The Honorable Ernest Y. Martin, Chair
and Members
Honolulu City Council
530 South King Street, Room 202
Honolulu, Hawaii 96813-3065

Dear Chair Martin and Councilmembers:

Subject: U.S. Environmental Protection Agency (EPA) Inspection Report Dated June 5, 2012, Regarding Operation and Maintenance of the Sand Island Wastewater Treatment Plant Solids Handling Facilities

For your information, please find attached the subject inspection report. We are preparing a response to submit prior to the August 30, 2012, due date.

If you have questions, please contact Ross Tanimoto, Deputy Director at 768-3482

Sincerely,

Timothy E. Steinberger, P.E.
Director

Attachment: EPA Inspection Report

APPROVED:

Douglas S. Chin
Managing Director

DEPT. COM. 538

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

June 11, 2012

In Reply Refer To: WTR-7

Ross Tanimoto, Deputy Director
Department of Environmental Services
City and County of Honolulu
1000 Uluohia Street, Suite 308
Kapolei, Hawaii 96707

'12 JUN 14 P3:25
DEPARTMENT OF ENVIRONMENTAL SVCS

Re: April 18, 2012 Clean Water Act Inspection

Dear Mr. Tanimoto:

Enclosed is the June 5th report for our April 18, 2012 inspection of the sludge handling processes of the Sand Island Wastewater Treatment Plant. Please submit a short response to the findings in Sections 1 and 2, to EPA, and the Hawaii Department of Health, by **August 30, 2012**. The main findings are summarized below:

1 A single digester operates at capacity or at times slightly over capacity, as measured by a comparison of solids retention times (SRT) against standard design criteria. Because the 2010 Consent Decree interim limits are statistically equivalent to the effluent discharge quality in 2009-2010, any increases in treatment plant loadings since then would necessitate increased solids removals, which if directed into the digester for waste stabilization would reduce the SRT and interfere with the reuse and disposal of sludge.

2 There is no redundant waste stabilization capacity. Any digester failure or scheduled maintenance of the digester lasting longer than the retention time in the sludge holding tanks (~ two weeks) would impair the ability to operate the Sand Island WWTP.

We appreciate your helpfulness extended to us during this inspection. We are available to the State of Hawaii Department of Health, and to you to assist in any way. Please do not hesitate to call Greg V. Arthur of my staff at (415) 972-3504 or e-mail at arthur.greg@epa.gov.

Sincerely,

Ken Greenberg, Chief
CWA Compliance Office

Enclosure

cc: Mike Tsuji, HDOH

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION 9

CLEAN WATER ACT COMPLIANCE OFFICE

NPDES COMPLIANCE EVALUATION INSPECTION REPORT

NPDES Permittee:	City and County of Honolulu (NPDES Permit No. HI0020117)
Facility:	Sand Island Wastewater Treatment Plant Solids Handling Facilities 91-480 Malakole Street, Honolulu, Hawaii 96707
Receiving Water:	Pacific Ocean
Date of Inspection:	April 18, 2012

Inspection Participants:	
US EPA:	Greg V. Arthur, Region 9, CWA Compliance Office, (415) 972-3504
Hawaii DOH:	Mike Tsuji, Supervisor, Enforcement Section, (808) 586-4309
City & County of Honolulu:	Earl Ng, Assistant Chief, Treatment Disposal Div, (808) 368-3468 Ross Tanimoto, Dep Director, Dept Envr Services, (808) 682-2282 Herman Tombee, Sand Island Shift Supervisor, (808) 768-4434
Synagro:	Clyde Harris, Plant Manager, (727) 546-2875 Jon Waltjen, Operations Manager, (808) 847-0800 Additional Info – On 6/1/12 from Layne Baroldi by e-mail

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Report Prepared By:	Greg V. Arthur, Environmental Engineer June 5, 2012

1.0 Scope and Purpose

On April 18, 2012, EPA and the State of Hawaii, Department of Health (HDOH) conducted a compliance evaluation inspection of the solids handing facilities of the City and County of Honolulu's (CCH) Sand Island Wastewater Treatment Plant, located in Honolulu, Oahu, Hawaii (Sand Island WWTP). The purpose was to ensure compliance with the NPDES permit and applicable Federal regulations covering the operation of the wastewater treatment plant solids handling facilities. In particular, it was to ensure:

- Compliance with the Standard NPDES permit Conditions, regarding the proper operation and maintenance of the solids handling facilities.

The Sand Island WWTP is a major NPDES permitted discharger of treated domestic wastewaters to waters of the United States. HDOH last issued NPDES Permit No. HI00200117 to CCH on September 30, 1998 with less-than-secondary limits based on a 301(h) waiver from the Federal secondary standards for organics and solids. In addition, CCH, EPA and HDOH agreed to a consent decree lodged on August 10, 2010. The 2010 Consent Decree established performance-based interim limits for organics and solids that supersede the NPDES permit limits until completion of the final compliance milestones set in Item 31 of the Consent Decree. The participants of this compliance evaluation inspection are listed on the title page. Arthur conducted the inspection.

See Figure 1 in Section 1.1 on page 3 for a schematic of the layout and configuration of the Sand Island WWTP solids handling facilities. Photo documentation of this inspection follows in Section 1.5 on page 5.

1.1 Facility Description

Ownership - CCH owns all portions of the Sand Island WWTP including the solids handling facilities inspected by EPA on this day.

Solids Generation - The Sand Island WWTP generates sludge solely from advanced chemically-aided primary clarification. The treatment plant does not provide secondary biological treatment. The primary sludge includes the dosed ferric chloride coagulant and polymer flocculent necessary to keep the solids removal rates high enough to maintain compliance with the 2010 Consent Decree interim limits for solids and organics in the WWTP effluent discharge. For April 2011 through March 2012, CCH determined that the Sand Island WWTP primary sludge generation rate averaged 28 dry tons per day and ranged from 24 to 33 dry tons per day. CCH also determined the solids content of thickened primary sludge to average 6.4% and range from 5.0% to 7.0%. This results in the production of 100,000 to 120,000 gallons of thickened primary sludge for solids handing.

Solids Handling Facilities - The solids handling facilities comprises thickened sludge equalization in four holding tanks each with a capacity of 108,000 gallons, anaerobic stabilization in a single 2.35 million gallon egg-shaped digester, stabilized sludge

equalization in an 800,000 gallon surge holding tank, centrifuge dewatering, solids pelletizing through drum oven drying and cooling, and pelletizing fume destruction through an air condenser, bag house, fume scrubber, and thermal-oxidizer. See Photos #1, #2, and #3 in Section 1.5 on page 5 of this report.

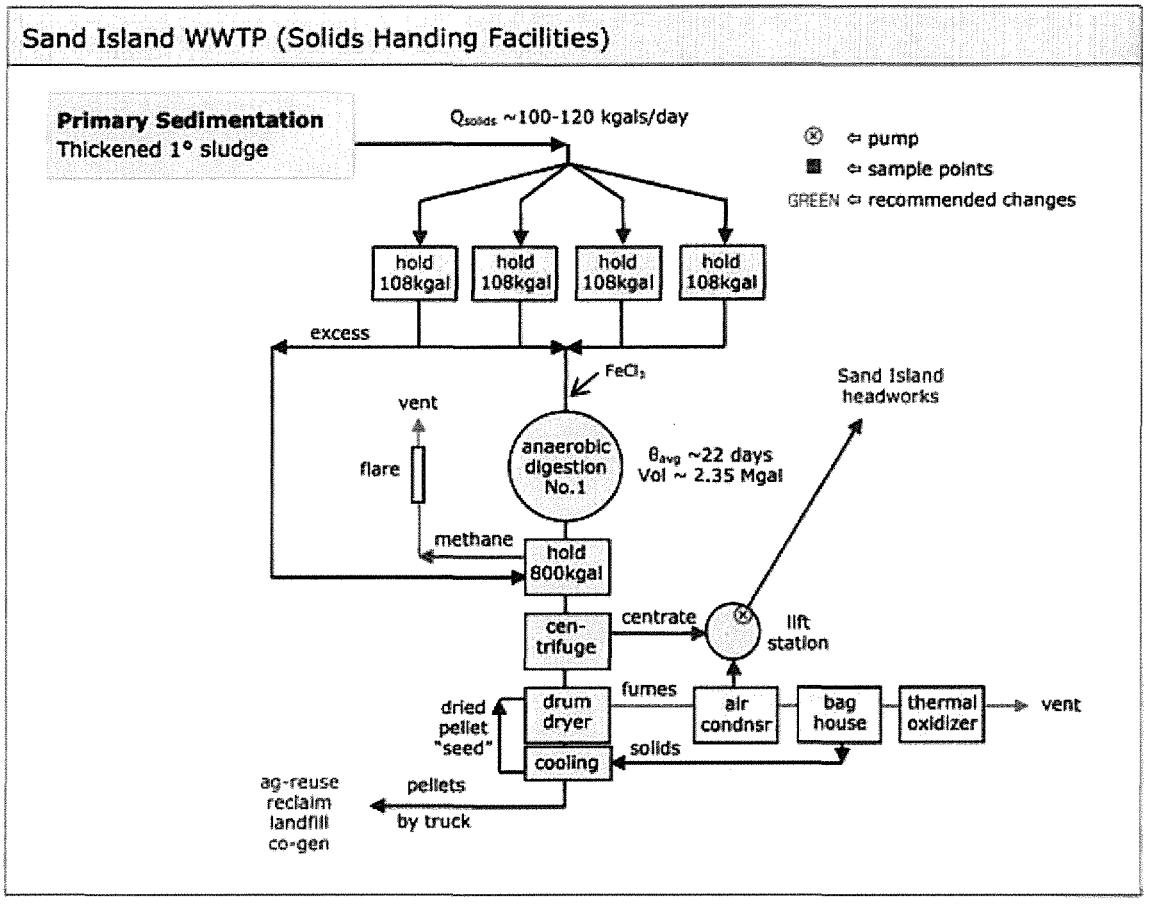

Figure 1 – Current Configuration and Layout

1.2 Facility Operations

CCH contracts with Synagro to provide the operation and maintenance of the Sand Island WWTP solids handling facilities.

Delivery - The operating procedures start with CCH informing Synagro of how much thickened primary sludge must be drawn from the Sand Island WWTP for disposal. The Synagro representatives stated that currently they are required to draw between 100,000 and 120,000 gallons of sludge per day. Synagro directs the thickened primary sludge to a single egg-shaped digester but can temporarily bypass excess volumes around the digester to the centrifuge and drum drying oven for stabilization through sludge drying. The CCH representatives indicated that in the past year, because of

intermittent digester operations over capacity, CCH prepared emergency procedures to off-haul excess sludge by truck to other CCH wastewater treatment plants.

Digester Operation - Synagro operates the single digester in the mesophilic temperature range with the digester temperature kept at a constant 97.9°F to 98.2°. Digester capacity and the sludge loading rates resulted in solids retention times (SRTs) in April 2011 through March 2012 that averaged 22 days, with the minimum and maximum SRTs ranging from 19 to 26 days. According to CCH, the digester produces between 250,000 and 300,000 standard cubic feet of methane per day.

Dewatering - Synagro outlets digested sludge from the digester to a surge tank for metered feed through two dewatering centrifuges followed by a pelletizing drum dryer. The dryer operates at a sludge inlet temperature of 1,000°F, with a cooling cycle reducing the pellet outlet temperature to 200°F. The oven heating involves burning methane generated by the digester with excess methane burned by flare. The surge tank provides 6.5 to 8.0 days of stabilized sludge holding. Fumes from the pelletizing drum dryer also are directed through fume scrubbing with the bag house solids returned to the drum dryer, and air condenser condensate returned along with centrifuge centrate to the Sand Island WWTP headworks.

Solids Disposal - CCH collects the pelletized digested sludge for off-hauling by truck to agriculture reuse when the SRT is over 18 days. According to CCH, when the SRT is less than 18 days, CCH hauls the pelletized digested sludge to a municipal landfill. Also according to CCH, Hawaiian Electric by agreement can take digested sludge for co-generation but only when the SRT is over 18 days. See Photo #4 in Section 1.5 on page 5 of this report.

1.3 Facility SIC Code

The CCH Sand Island Wastewater Treatment Plant is assigned the SIC code for sewerage systems (SIC 4952).

1.4 References

[1] WEF Manual of Practice 8, Design of Municipal Wastewater Treatment Plants, Volume 3, Chapter 22 Stabilization, pp. 22-20, 4th Ed. 1998, Water and Environment Federation, Alexandria, VA, and the American Society of Civil Engineers, Reston, VA. http://www.wef.org/mop8

[2] Ibid., WEF Manual of Practice 8, Vol 3, Chapter 22, pp. 22-17 and 22-27.

[3] Ibid., WEF Manual of Practice 8, Vol 3, Chapter 22, pp. 22-32.

[4] Ibid., WEF Manual of Practice 8, Vol 3, Chapter 22, pp. 22-12 and Figure 22.2.

1.5 Photo Documentation

Four of the six photographs taken during this inspection are depicted below and saved as *sandisland-01-041812.jpg through sandisland-06-041812.jpg.*

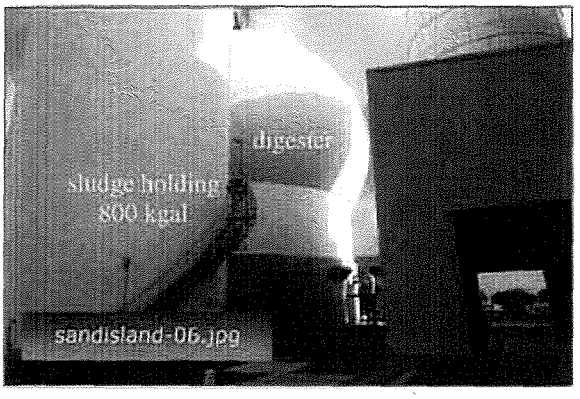

Photo #1: Sand Island WWTP Single Digester
Taken By: Greg V. Arthur
Date: 04/18/12

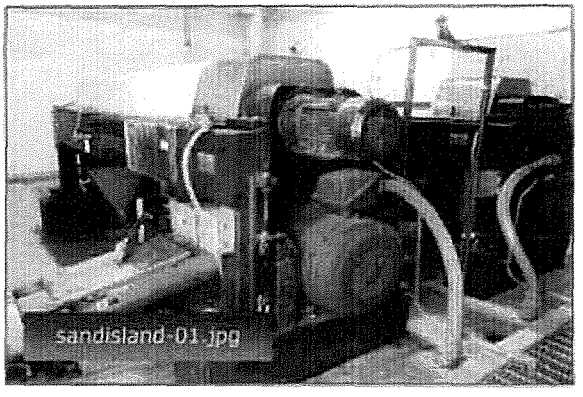

Photo #2: Sand Island WWTP Sludge Centrifuges
Taken By: Greg V. Arthur
Date: 04/18/12

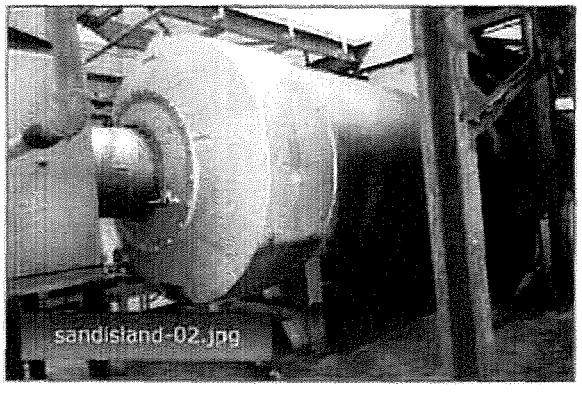

Photo #3: Sand Island WWTP Pelletizer Drum Dryer
Taken By: Greg V. Arthur
Date: 04/18/12

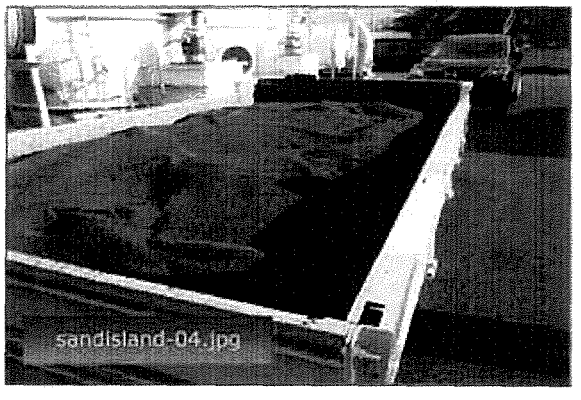

Photo #4: Sand Island WWTP Sludge Pellets
Taken By: Greg V. Arthur
Date: 04/18/12

2.0 NPDES Permit Limits and Conditions

The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by the Permittee only when the operation is necessary to achieve compliance with the conditions of this permit.

NPDES Permit No.HI0020117
Provision 9, HDOH Standard NPDES Permit Conditions

This compliance review was limited to NPDES permit provisions regarding the proper operation and maintenance of the solids handling facilities at the Sand Island WWTP.

Summary

Synagro currently operates the single Sand Island WWTP digester at capacity or at times slightly over capacity, as measured by a comparison of solids retention times (SRT) against standard design criteria. Because the 2010 Consent Decree interim limits are statistically equivalent to the discharge quality in 2009-2010, any increases in treatment plant loadings would necessitate increased solids removals, which if directed to the digester for waste stabilization would reduce the SRT and interfere with sludge reuse and disposal. Since the removal of primary solids is necessary to achieve compliance with the consent decree interim limits, and since removed solids require stabilization for disposal, operating the digester at SRTs below standard design criteria would not be considered proper operation and maintenance of the treatment and control used to achieve compliance.

Requirements

- None.

Recommendations

- CCH should increase digester capacity in order to increase the solids retention time above the standard design criteria.

- CCH should provide enough redundant digester capacity to ensure the continuous operation of the solids stabilization facilities at the Sand Island WWTP.

2.1 Performance Requirements

The 2010 Consent Decree established interim limits for biochemical oxygen demand (BOD), and total suspended solids (TSS) based on the recent past performance of the Sand Island WWTP. These interim limits are listed below. They were derived from an analysis of daily self-monitoring results from 2009-2010 and set at the statistically calculated 95th% events.

2010 Consent Decree Interim Limits			
Sand Island WWTP	Month-Avg	Week-Avg	Daily-Max
BOD concentration	119 mg/l	122 mg/l	-
mass loading	89414 lbs/day	91594 lbs/day	-
removal rate	30%	-	-
TSS concentration	48 mg/l	50 mg/l	-
mass loading	36349 lbs/day	37403 lbs/day	-
removal rate	60%	-	-

As a result, these interim limits constrain the future effluent discharge quality of the Sand Island WWTP to be statistically equivalent to the reference years of 2009-2010. These interim limits will remain in effect until completion in 2035 of the final compliance milestones for the installation of secondary treatment. In effect, through 2035, consistent compliance with these interim limits will require CCH to remove solids at rates equal to or greater than the rates in the reference years of 2009-2010.

2.2 Digester Capacity

The capacity, as measured by the SRT, of a high-rate, constant-temperature, mesophilic digester for primary solids largely depends on the volume over time and solids content of the primary sludge delivered for waste stabilization [1]. See Section 1.4 on page 4.

From April 2011 through March 2012, the CCH Sand Island WWTP operations to comply with the 2010 Consent Decree interim limits resulted in generated sludge volumes over time of 100-120 kgal/day with solids contents around 6.4%. In order to handle these loadings, Synagro operated the digester at SRTs of 19 to 26 days with an average SRT of 22 days. The SRT design standard design criteria for high-rate, constant-temperature, mesophilic digesters is usually listed as 15 to 20 days for mixed primary and secondary sludges [2]. But for primary sludges only, the SRTs are higher, with the SRTs for 45% of high-rate, constant-temperature, mesophilic digesters surveyed nationwide falling between 21 and 25 days, 11% at 16 to 20 days, and the remaining 44% above 26 days [3].

As a result, Synagro currently operates the single Sand Island WWTP digester at capacity or at times slightly over capacity since the average SRTs are reported as

essentially equivalent to the standard design criteria [3], and the low end of the Sand Island SRT range is below the low end of the standard design criteria.

This means any increase over 2009-2010 treatment plant influent loadings would necessitate increased solids removals over current levels in order to comply with the 2010 Consent Decree interim limits. Any increased solids loadings directed into the digester for waste stabilization would reduce the SRT. According to CCH, at SRTs below 18 days, digested and pelletized sludge would be disqualified from agricultural reuse and as co-generation feedstock. At SRTs below 10-12 days, methane fermentation would not come to completion which results in the washout of un-stabilized solids [4].

2.3 Redundancy

There is only one digester. The equalization tanks before and after the digester can provide at a maximum around 12 days of emergency retention. The pelletizing drum dryer also could heat stabilize undigested solids for an unspecified time as a temporary measure. However, in essence, any digester failure or scheduled maintenance of the single digester lasting longer than 12 days would result in an impairment or inability to operate the Sand Island WWTP.